

Surface energy and...

S/137/62/000/006/003/163  
A005/A101

refinement of high-temperature lanthanide modification.

A. Shalimov

[Abstracter's note: Complete translation]



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113950  
114100

S/126/61/011/003/001/017  
E032/E414

AUTHOR: Zadumkin, S.N.

TITLE: A New Version of the Statistical Electron Theory of  
the Surface Tension of Metals

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.3,  
pp.331-346

TEXT: The Thomas Fermi statistical theory is used to develop an expression for the surface tension of metals as a function of temperature. The formulas obtained are used to predict numerical values for Na, K, Rb, Cs, Mg, Ca, Sr and Ba. The theory is developed from the following basic considerations. Consider a model of a metal in which the positive ions are looked upon as immersed in an electron liquid whose density is  $\rho(x)$ , where the X axis forms an outward normal to the metal-vacuum separation boundary. The separation boundary is assumed to be in the form of a plane, so that the problem is essentially one-dimensional. In the first approximation, the electron density  $\rho(x)$  and the potential  $V(x)$  near the surface of the metal can be calculated using the method put forward by Frenkel' (Ref.13). For  $x > 0$  the Thomas-Fermi approximation yields

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$$\nabla^2 V = \frac{d^2 V}{dx^2} = 4\pi e \rho(x) = 4\pi \gamma e V^{3/4}(x), \quad (1)$$

where  $e$  is the electronic charge,  $\gamma = 2^{3/2}/3\pi^2 e^2 a_0^2$  and  $a_0$  is the first Bohr orbit. For  $x < 0$

$$\nabla^2 V = \frac{d^2 V}{dx^2} = 4\pi e [\rho(x) - \rho_+(x)] = 4\pi \gamma e [V^{3/4}(x) - V_1^{3/4}], \quad (2)$$

where  $\rho_+(x)$  is the positive ion density and

$$eV_1 = E_g = \frac{5}{3} k_B T^{2/3}(\infty).$$

Eq. (1) and (2) are joined on the surface  $x = 0$  subject to the requirement that  $V$  and  $dV/dx$  are continuous. Since the system is neutral,  $dV/dx = 0$  when  $x = \pm \infty$ . Moreover,  $V = 0$  when  $x = +\infty$ , and  $V = V_1$  when  $x = -\infty$ . The solution of Eq. (1) and (2), subject to the above boundary conditions, gives the

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following expressions for the electron density and the potential

$$\rho(\epsilon) = \rho(\infty) \chi^{0/\epsilon}(\epsilon); \quad (3)$$

$$V(\epsilon) = V_1 \chi(\epsilon); \quad (4)$$

where

$$\chi_\epsilon(\epsilon) = \frac{\chi(0)}{(1+\epsilon/b)^\epsilon} \quad \text{при } \epsilon > 0. \quad (5)$$

$$\epsilon = - \int_{\chi(0)}^{\chi_1(\epsilon)} \frac{d\chi(\epsilon)}{[\epsilon/2; \chi(\epsilon) - 2\chi_1(\epsilon) + \epsilon/2]^\epsilon} \quad \text{при } \epsilon < 0. \quad (6)$$

$$\epsilon = x/s; s = (3\pi/2)^{1/3} (e/a_0 V_1)^{1/3} a_0; \chi(0) = 3/2; b = 2(125/3)^{1/3}.$$

Moreover, for  $\epsilon \leq 0$

$$\chi_1(\epsilon) = 1 - \frac{A}{(1-\epsilon/b)^\epsilon} \quad (7)$$

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In order to determine the constants  $A$  and  $n$  one can use the equations

$$\chi_i(0) = \chi_e(0). \quad (8)$$

$$\left( \frac{d\chi_i}{ds} \right)_{s=0} = \left( \frac{d\chi_e}{ds} \right)_{s=0}. \quad (9)$$

(9)

from which it is found that  $A = 1 - \chi(0)$  and  $n = 6$ , and consequently

$$\chi_i(s) = 1 - \frac{1 - \chi(0)}{(1 - s/b)^6} \quad \text{up to } s < 0. \quad (10)$$

Following Wigner and Seitz (Ref.12), the crystal lattice is divided as follows. The lines connecting a given atom with its nearest neighbours are cut at their mid-points by planes perpendicular to them. In this way each atom becomes confined to a corresponding polyhedron formed by this construction. The polyhedron is then replaced by a sphere of equivalent volume. It

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is quite clear that, at a sufficient distance from the boundary, each of these elementary spheres is electrically neutral since it contains a positive ion with a charge  $z$  and  $z$  electrons ( $z$  is the average number of valence electrons per atom). The electron gas density in the elementary sphere is  $\rho(x) = z(x)/\Omega(x)$  where  $\Omega(x)$  is the volume of the elementary sphere and is equal to  $\frac{4}{3}\pi R^3(x)$ . On the first approximation  $R(x) = R(\infty) = R$ . This formalism is continued to compute the free surface energy of the metal and to determine the Gibbs surface. The calculation is divided into two parts, namely the contributions of the external and internal electron densities to the surface energy. Since the elementary spheres at a sufficient distance from the boundary are neutral and the electron clouds of neighbouring ions do not overlap, their interaction is assumed to be largely of the Van der Waals type. In the neighbourhood of the transition layer, the elementary spheres are no longer neutral and the electrostatic interaction energy between positively charged elementary spheres must be taken into account. The final expression for the surface tension includes terms representing the Coulomb, the zero-point and the

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exchange-correlation energy, as well as the Weizsacker correction to the Fermi energy. Table 1 shows the calculated and the experimental values of the surface tension of liquid metals. A detailed examination of the various contributions to the surface energy shows that non-Coulomb forces constitute a negative contribution while the Weizsacker correction is quite small. Planes having the maximum reticular density have the minimum molar surface energy. The temperature coefficients of surface energy are negative for all the metals. The surface energy of the liquid metal approaches the surface energy of the crystal face with the minimum specific surface energy. The surface energy obtained in the present paper is very close to the theoretical result of R. Stratton (Ref.7). The fact that previously published theoretical values for the surface energy of metals are not in good agreement with experiment is ascribed to the fact that not all the contributions to the energy of the metal were taken into account. Acknowledgments are expressed to the Chairman of the Intercollegiate Colloquium on Surface Phenomena in Melts of the IONKh AS USSR, Professor V.K.Semenchenko, who introduced the present paper to the

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Colloquium on April 12, 1960. There are 3 tables and  
24 references: 15 Soviet and 9 non-Soviet.

ASSOCIATION: Kabardino-Balkarskiy gosudarstvennyy universitet  
(Kabardino-Balkar State University)

SUBMITTED: June 7, 1960

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Table 1.

Металл Metal	Экспер. Экспер. значения values	Теоретические значения Calculated values					
		A. Г. Самодедов [5] A. G. Samodedov А. Г. Самодедов	А. Г. Самодедов [6] A. G. Samodedov А. Г. Самодедов	А. Е. Глазеберман и И. Н. Спирков- ский [3, 4] A. E. Glazebor- man and I. N. Spirkov- skiy [3, 4]	Л. Г. Дорфман [2] L. G. Dorfman Л. Г. Дорфман	Страттон Страттон [7] Stratton [7]	Балдаев Балдаев [22] Baldaev [22]
Na	191	400	777	206,00	50—60	440	190
K	101	224	333	114,60	180	70	98
Ra	77,5			140	50	33	86,8
Ca			204	130	10	27	59,8
Mg	547					23	48,0
Ca	365						630
Sr							420
Ba	11						272
							248

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ZADUMKIN, S.N.

Excess surface energy of a drop in dependence on its radius.  
Zhur.fiz.khim. 35 no.12:2818-2819 D '61. (MIRA 14:12)  
(Kabardino-Balkarskiy universitet)  
(Drops)

ZADUMKIN, S. N. (Nal'chik)

Surface activity of metals. Izv. AN SSSR, Otd. tekhn. nauk.  
Met. i topl. no.1:168-169 Ja-F '62. (MIRA 15:2)

1. Kabardino-Balkarskiy gosudarstvennyy universitet.  
(Liquid metals)  
(Surface tension)

8/159/62/000/004/009/018  
E132/E435

AUTHORS: Zadumkin, S.N., Khulamkhanov, V.Kh.  
TITLE: The surface energies of certain oxides, sulphides and selenides  
PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Fizika, no.4, 1962, 112-114

TEXT: By the approximate methods already explained (Izv. VUZ Fizika, no.2, 1958 and no.6, 1960 and Uch. zap. KGU, no.3, 1959), surface energies of certain oxides, sulphides and selenides which have the NaCl or wurtzite structure with a significantly ionic bond character are calculated. The compounds in question are MgO, CaO, BaO, NiO, MgS, CaS, CaSe, MnO, BaSe, ZnO, ZnS. The calculated values for the 100 planes (if cubic) or 1000 planes (if hexagonal) of compounds of the NaCl type, depart from the results of Born by 5 to 10% except for MgO and MnO for which the deviation is 20%. This latter is explained by the inexactitude in  $n$  - which is undefined. Using a formula given in ZhNKh, v.35, no.11, 1959 by one of the present authors, S.N.Zadumkin, the surface energy is also calculated including the anharmonicity of the ionic

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The surface energies ...

S/139/62/000/004/009/018  
E132/2435

vibrations but the lack of experimental values of the Debye characteristic temperatures prevent the results from having any practical use. There is 1 table.

ASSOCIATION: Kabardino-Balkarskiy gosuniversitet  
(Kabardino-Balkarian State University)

SUBMITTED: February 24, 1961

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S/185/62/007/007/001/010  
I048/I248

AUTHOR: Zadumkin, S.N.

TITLE: On the statistical electron theory of the free  
surface energy of binary metal solutions

PERIODICAL: Ukrains'kyy fizichnyy zhurnal, v.7, no.7,  
1962, 715-719

TEXT: The free surface energy of binary metallic solutions  
( $\sigma$ ) is derived on the basis of the general statistical law for  
the ordering of atoms in a solution and the theory of the surface  
energy of metals previously developed by the author (FMM v.11,  
no. 3, 1961, 331). The short-range order only is taken into account  
and the following equation is obtained for very low concentrations

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S/185/62/007/007/001/010  
I048/I248

On the statistical electron...

with a relatively high degree of absorption of the additive:

$$\sigma' \approx \sigma_A / [1 - \delta_B^{(0)} (1 - n_A/n_B)], \quad (22)$$

where  $\sigma_A$  is the  $\sigma'$  of the solvent,  $\delta_B^{(0)}$  is the absorption of the solutions,  $n_A$  and  $n_B$  are the number of particles in one sq.cm. of the surface of the pure solvent and solute, respectively. Calculations based on this equation agree with published experimental data. Thus, in the case of a cesium amalgam at 22°C (cesium concentration =  $10^{-2}$  at %) the calculated value of  $\sigma'$  is 340 erg/sq.cm., while the experimental value (taken from P.P. Pugachevich and O.A. Timofeevicheva, Zh F Kh 33, no.10, 2196, 1959) is 345.0 erg/sq.cm. This is the first discussion of the surface energy of dilute metallic solutions in the light of the electron theory.

ASSOCIATION: Kabardino-Balkarskiy universitet (The Kabardino-Balkarskiy University, Nal'chik)

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ZADUMAIN, S.N.

Statistical electron theory of the interfacial energy of metals  
at the crystal - melt boundary. Fiz. met. i metalloved. 13  
no.1:24-32 Ja '62. (MIFI 15:3)

1. Kabardino-Balkarskiy gosudarstvennyy universitet.  
(Surface energy) (Electron analog computers)

21160  
S/126/62/013/005/003/031  
E032/E514

AUTHORS: Zadurkin, S.N. and Kholonov, Kh.B.

TITLE: The surface energy of thin metallic films

PERIODICAL: Fizika metallov i metallovedeniye, v.15, no.5, 1962,  
658-662

TEXT: It has been suggested that the surface energy of thin films, small drops and so on may be different from the surface energy of matter in bulk and the aim of the present paper is to investigate this problem for thin metallic films, using the statistical electron theory of surface energy developed by the first of the present authors in a previous paper . . . ( FPM, 1961, 11, 551). The film is assumed to be isotropic and quasi-uniform, surface irregularities are taken to be absent, the "weight thickness" is such that  $h_s < h$  and  $q = h_s/h \lesssim 1$  and  $1 - q \ll 1$ . The Thomas-Fermi equation for the film is solved using the isotropic model of a metal put forward by Ya. I. Frenkel' . . . ( Zs.Phys., 1923, 49, 31), and an explicit expression is obtained for the surface energy. It is found that the latter is mainly dependent on the parameter  $\delta$ . For example, in the case of potassium

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The surface energy of thin ...

S/126/62/013/005/005/051  
E052/E514

with a thickness of about 100 Å and  $\delta = 0.2$ , the relative change in the surface energy is about 30%. When  $\delta = 0$  the surface energy of a metal film with thickness  $h \geq 30s$  ( $s = 0.916$  Å for potassium and 0.762 Å for calcium) is practically identical with the surface energy of massive specimens. There are 1 figure and 1 table.

ASSOCIATION: Kabardino-Balkarskiy gosuniversitet  
(Kabardino-Balkarian State University)

SUBMITTED: July 17, 1961 (initially)  
December 16, 1961 (after revision)

Card 2/2

ZADUMKIN, S.N.

Temperature dependence of the surface tension of metals. Fiz.  
met. i metalloved. 14 no.3:457-458 S '62. (MIRA 15:9)  
(Surface tension)

11739

8/020/62/146/006/014/016  
B107/B186114105  
11-341

AUTHORS: Zadumkin, S. N., Pugachevich, P. P.

TITLE: Temperature dependence of the surface tension of metals

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 146, no. 6, 1962, 1363-1366

TEXT: In Fiz. met. i metalloved., v. 11, no. 3, 331 (1961) S. N. Zadumkin, calculated the temperature dependence,  $d\sigma/dT$ , of the surface tension of liquid metals without considering the facts that ionic vibrations are an-harmonic and that the Fermi energy  $\mu_0$  is thermally smeared out. The

formula presented here allows for those factors:

$$\frac{d\sigma'}{dT} = - \left\{ 2\alpha_1 \sigma + 0.81 SD \left[ \frac{R}{A} + 8T \left( \frac{k}{h} \sqrt{\frac{R}{A}} \right)^2 + 24.6 Z \frac{R}{A} \frac{kT}{\mu_0} \right] \right\},$$

where  $\alpha_1$  is the coefficient of linear thermal expansion; D is the density of the liquid metal;  $S = (37/2)^{7/2} 1/2 (e/a_0 v_i)^{1/4} a_0$ ; R is the gas constant; Z is the

mean number of free electrons per metal atom. The remaining symbols are defined in the paper cited above. The first three addends in this formula

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S/020/62/146/006/014/016  
B107/B186

Temperature dependence ...

are approximately equal while the last is greater by nearly one order of magnitude. The first and third terms correspond to the anharmonic vibrations of ions as well as to the expansion of the metal and to the change in ionic energy associated therewith; the second term corresponds to the altered ionic vibrations in the transition region produced by an electron density gradient; the last term corresponds to the smearing out of the Fermi energy. Using Grüneisen's and Lindemann's approximations, the formula can be rewritten as

$$\frac{d\sigma}{dT} = - \left\{ \frac{0.044\tau}{T_S} + \frac{0.328}{V_a} \left( \frac{a}{Z} \right)^{1/6} \left[ 1 + 0.832 \frac{T}{T_S} + 0.82 \cdot 10^{-4} \left( \frac{Z}{V_a} \right)^{1/3} V_a T \right] \right\},$$

where  $T_S$  is the melting point, and  $V_a$  is the atomic volume. Table 1 shows that the experimental values of  $d\sigma/dT$  are consistent with calculated data. There is 1 table in the document.

ASSOCIATION: Kabardino-Balkarskiy gosudarstvennyy universitet (Kabardino-Balkarskiy State University). Institut obshchey i neorganicheskoy khimii im. N. S. Kurnakova Akademii nauk SSSR

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Temperature dependence ...

S/020/62/146/006/014/016  
B107/B186

(Institute of General and Inorganic Chemistry imeni N. S.  
Kurnakov of the Academy of Sciences USSR)

PRESENTED: May 31, 1962, by I. I. Chernyayev, Academician

SUBMITTED: May 29, 1962

Legend to Table 1: (1) metal; (2)  $d/dT$ , erg/cm<sup>2</sup>.deg; (3) calculated  
value; (4) experimental value. X

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5/181/63/005/001/007/064  
B102/B186

AUTHORS: Zadumkin, S. N., and Khulamkhanov, V. Kh.

TITLE: A simple method for calculating the surface energy of ionic crystals

PERIODICAL: Fizika tverdogo tela, v. 5, no. 1, 1963, 40-51

TEXT: The surface energy  $\sigma_0$  of the (100) face of alkali halide crystals at  $T=0$  had already been determined by many authors, but their results differed widely. The simple method put forward here affords not only the Madelung and Born energies, but also the possibility of determining the parts played by dipole-dipole and quadrupole-dipole interaction and by zero energy oscillations in bringing about  $\sigma_0$  (100). The energy  $E_v^{(k)}$  of an ion - be it Coulomb, Van der Waals, Born or any other sort of energy - is written as

$$E_v^{(k)} = E_{os}^{(k)} + 2E_{v/2}^{(k)} \quad (1)$$

where  $E_{os}^{(k)}$  is the energy of the k-th ion in a plane grid, and  $2E_{v/2}^{(k)}$  the

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A simple method for ...

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B102/B106

energy of the ion in the crystal when the plane grid is disregarded. The extra surface energy per ion is given by  $\Delta E^{(k)} = E_{\infty}^{(k)} - E_v^{(k)}$ , (2), where  $E_v^{(k)}$  is the ion energy of the surface of a semi-infinite crystal.

Since  $E_{\infty}^{(k)} = E_{\infty}^{(k)} - E_{\infty/2}^{(k)}$ , (3), therefore

$$\Delta E^{(k)} = \frac{1}{2} E_v^{(k)} \left\{ \frac{E_{\infty}^{(k)}}{E_v^{(k)}} - 1 \right\}. \quad (4).$$

Introducing the energy relationship  $\frac{E_{\infty}^{(k)}}{E_v^{(k)}} = \frac{A_v^{(k)}}{A_{\infty}^{(k)}}$ , denoted below by  $\eta^{(k)}$ , the expression obtained for the total molar surface energy of the (100) face is:  $\sigma_0^m(100) = \frac{N}{2} \sum_k E_v^{(k)} (\eta^{(k)} - 1)$ , where the summation over  $k$  covers all forms of binding energy. If  $2r^{-2}$  is the number of all particles of the same sign per unit area of (100), then  $\sigma_0(100) = 4r^{-2} \sum_k E_v^{(k)} (\eta^{(k)} - 1)$ , where  $r$  is the smallest equilibrium distance between anions and cations. If the internal anion-cation binding energy is taken into account, then

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B102/B186

$$\sigma_0(100) = \frac{1}{4r^2} \left[ \sum_k E_k^{(k)} (\eta^{(k)} - 1) - 0.381 E_0 \right]. \quad (9)$$

$E_0 = h\nu/2$ . The expression for the contribution of the zero oscillation energy to  $\sigma_0(100)$  is given by  $\Delta\sigma \approx -0.0952 E_0 / r^2$ . The  $\eta^{(k)}$  and  $\sigma$  components and the total value of  $\sigma_0(100)$  are tabulated for 12 alkali halide crystals. There are 2 tables.

ASSOCIATION: Kabardino-Balkarskiy gosudarstvennyy universitet, Nal'chik  
(Kabardino-Balkar State University, Nal'chik)

SUBMITTED: July 16, 1962

Card 3/3

ACC NR: AR6035406

SOURCE CODE: UR/0137/66/000/C09/A007/A007

AUTHOR: Zadumkin, S. N.

TITLE: Modern theories of the surface energy of pure metals

SOURCE: Ref. zh. Metallurgiya, Abs. 9A40

REF. SOURCE: Sb. Poverkhnostn. yavleniya v rasplavakh i vosnikayushchikh iz nikh tverd. fazakh., Nal'chik, 1965, 12-29

TOPIC TAGS: metal surface, surface energy, surface tension, statistic analysis, melting point

ABSTRACT: This is a review of the theories of surface tension  $\sigma$  of pure metals. The main premises of the statistical electron theory of  $\sigma$ , developed by the author, are considered. The experimental and calculated values of  $\sigma$  are generalized for pure metals at the melting temperature. Bibliography, 83 titles. D. Kashayeva.  
[Translation of abstract]

SUB CODE: 11, 20

UDC: 669-154:532.61

Card 1/1

ZADUMKIN, S.N.; PUGACHEVICH, P.P.; NGUYEN FONG

Temperature dependence of the surface energy of transition metals.  
Zhur.fiz.khim. 39 no.10:2591~2595 0 '65.

(MJRA 18:12)

J. Kabardino-Balkarskiy gosudarstvennyy universitet i Moskovskiy  
khimiko-tehnologicheskiy institut imeni Mendeleyeva. Submitted  
July 9, 1964.

ACC NR: AR6013660

SOURCE CODE: UR/0058/65/000/01.0/E010/E010

AUTHOR: Zadumkin, S. N.; Khokonov, Kh. B.

TITLE: Dependence of the surface energy of a metal drop on its radius

SOURCE: Ref. zh. Fizika, Abs. 10E75

REF SOURCE: Uch. zap. Kabardino-Balkarsk. un-t. Ser. fiz.-matem. n., vyp. 19, 1963,  
505-508

TOPIC TAGS: ~~surface property~~, liquid metal, magnetic thin film, METAL SURFACE

TRANSLATION: It is shown that the change in the surface energy of a metal drop with a change in its radius is subject to the law as is a thin film, only with higher values of the corresponding coefficients (see RZhFiz, 1962, 11E521).

SUB CODE: 11,20

UDC: 532+537.311+538.1

Card 1/1

ACC NR: AR7000868

SOURCE CODE: UR/0058/66/000/009/E043/E043

AUTHOR: Khokonov, Kh. B.; Zidumkin, S. N.

TITLE: Dependence of the interphase energy of metals at the crystal-fusion interface on particle size

SOURCE: Ref. zh. Fizika, Abs. 9E348

REF SOURCE: Sb. Poverkhnostn. yavleniya v rasplavakh i voznikayushchikh iz nikh tverd. fazakh. Nal'chik, 1965, 75-78

TOPIC TAGS: surface tension, electron microscopy, interphase energy, particle size, ion microscopy, grain size

ABSTRACT: On the basis of the statistical electron theory of surface tension (RZhFiz, 1961, 11E209) an approximate equation is derived to calculate the specific free interphase energy  $\sigma_{12}$  at the interface of the melt with spherical metallic grains (applicable to metals of groups IA and IIA). It is shown that  $\sigma_{12}$  decreases as the grain size decreases. B. Summ. See also: Structural analysis: interaction between radiations and solid bodies. Volume A— Devices and installa-

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ACC NR. AR7000868

tions. Methods of research (electron and ion microscopy). [Translation of  
abstract] [GC]

SUB CODE: 20, 11/

Card 2/2

ACC NR: AR7000867 SOURCE CODE: UR/0058/66/000/009/E043/E043

AUTHOR: Karashayeva, A. A.; Zadumkin, S. N.

TITLE: Interphase surface energy at the interface of dissimilar metals

SOURCE: Ref. zh. Fizika, Abs. 9E346

REF SOURCE: Sb. Poverkhnostn. yavleniya v rasplavakh i voznikayushchikh iz nikh tverd. fazakh. Nal'chik, 1965, 79-84

TOPIC TAGS: zinc surface energy, cadmium surface energy, tin surface energy, surface energy, zinc mercury system

ABSTRACT: Based on the statistical theory of the surface energy of metals, the interphase energy is evaluated at the interface of dissimilar metals. Approximate equations are derived and used, calculating the values of surface energy at 20C for zinc, cadmium and tin at the interface with nearly all metals of the groups I to IV. The results show that if the electron density of the metal being studied (Zn, Cd, Sn) is higher than that of the elements of the given group of the Periodic Table of Elements, the interphase energy increases with the increasing atomic number of the elements. A good correlation is shown for the zinc mercury

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ACC NR: AR7000867

system between the calculated and experimental values which were based on data on the absorption reduction of the strength of zinc. B. Sumn. [Translation of abstract] [GC]

SUB CODE: 11, 20/

Card 2/2

ACC NR: AR7000866

SOURCE CODE: UR/0058/66/000/009/E042/E043

AUTHOR: Zadumkin, S. N.; Karashayev, A. A.

TITLE: Correlation between surface energies of metals in the solid and liquid phases

SOURCE: Ref. zh. Fizika, Abs. 9E345

REF SOURCE: Sb. Poverkhnostn. yavleniya v rasplavakh i voznikayushchikh iz nikh tverd. fazakh. Nal'chik, 1965, 85-88

TOPIC TAGS: solid state, liquid metal, zinc mercury interface, polycrystal, surface energy, heat of sublimation, heat of mixing

ABSTRACT: An approximation equation has been derived for calculating the surface energy on the interface of solid and liquid metals as a function of the surface energy of both metals, their coordination numbers, heats of sublimation, heat of mixing, and other parameters. The obtained equation is used to evaluate the correlation between the surface energy of solid and liquid metals, to determine the surface energy on the interface of polycrystal grains, and on the interface of two polymorphous phases. The surface energy on the interface of Zn/Hg was also calculat-  
ed. B. Summ. [Translation of abstract] [GC]

Card 1/1 SUB CODE: 11, 20/

ACC NR: AR7000865 SOURCE CODE: UR/0058/66/000/009/E042/E042

AUTHOR: Dokhov, M. P.; Zadumkin, S. N.

TITLE: The surface energy of metals of the actinide group

SOURCE: Ref. zh. Fizika, Abs. 9E344

REF SOURCE: Sb. Poverkhnost, yavleniya v rasplavakh i voznikayushchikh iz nikh tverd. fazakh. Nal'chik, 1965, 119-120

TOPIC TAGS: actinide, actinide metal, calculation, metal

ABSTRACT: The calculated values of the surface energy of certain actinides (Th, Pa, U, Np, Pu, Am, Cm) were compared. The equations of Zadumkin, Taylor, and MacLacklin were used for calculations. [Translation of abstract]

[GC]

SUB CODE: 11, 20/

Card 1/1

ZADUMKIN, S.N.; KARASHAYEV, A.A.

Interphase surface energy of metals at the boundary with  
dielectric fluids. Fiz.-khim. mekh. mat. 1 no.2:139-141 '65.  
(MIRA 18:6)

1. Kabardino-Balkarskiy universitet, Nal'chik.

"APPROVED FOR RELEASE: 03/15/2001

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APPROVED FOR RELEASE: 03/15/2001

CIA-RDP86-00513R001963410010-6"

ZADUMKIN, S.N.; NGUYEN FONG

Temperature dependence of the surface energy in transition metals.  
Fiz. met. i metalloved. 16 no.1:136-138 J1 '63. (MIRA 16:9)

1. Kabardino-Balkarskiy gosudarstvennyy universitet.  
(Transition metals) (Surface energy)

SCOTTISH. R.D. 1. 1000000. 1000000. 1000000. 1000000. 1000000.

卷之三十一

1996, the first year of the new millennium, the world's population reached 6 billion.

卷之三

1. The *liver* is the *principal* *metabolic* *organ* *in* *humans*.

DATE ACQ: 15.iii.63

STH CODE: PH, AP

ENCL: 00

APPROVED FOR RELEASE: 03/15/2001

CIA-RDP86-00513R001963410010-6"

STAKHNEVICH, V.L., inzh.; ZADUNAYSKIY, Ya.N., inzh.

Work of the institute "Giprotofrazvedka" in the prospecting of  
peat resources and designing of peat enterprises. Zbor. st.po  
izuch. torf.fonda no.2:5-14 '57. (MIRA 11:8)

1. Institut "Giprotofrazvedka."  
(Peat)

TADUNOV, A.

Propagandists of the Yenisey shipyard. Blok.agit.vod.transp.  
no.12:15-19 Je '56. (MLRA 9:8)

1. Zamestitel' redaktora gazety "Rechnik Yeniseya".  
(Yenisei River--Shipyards)

~~ZADUNOV, A.~~

Technical room in a ship repair plant. Blek. agit. vod. transp. no.3:  
27-31 F '57. (MLRA 10:4)  
(Krasnoyarsk--Ships--Maintenance and repair)  
(Technology--Information Services)

ZADURA, J.

ZULINSKI, T.; ZADURA, J.

Leptospirosis in silver foxes. Med.wet. 6 no.2:83-84 F '50.  
(CML 19:3)

1. Of the Institute of General Pathology and Pathological Anatomy of  
Marie Curie-Sklodowska University in Lublin and of the Department of  
Pathological Anatomy of the National Veterinary Institute in Pulawy  
(Head -- Tadeusz Zulinski, M.D.).

*ZADURA J.*  
EXCERPTA MEDICA Sec 5 Vol 12/3 Gen. Path. Mar 59

154. INVESTIGATIONS ON THE RETICULO-ENDOTHELIAL (HISTIOCYTIC) SYSTEM IN HORSES HYPERIMMUNIZED BY ERYSIPHELOTHRIX RHUSIOPATHIAE - Badania nad układem stąeczkowo-śródłonkowym (histiocytarnym) u koni hyperimmunizowanych włoskowcem rózycy - Zadura J. Zakt, Anat. Patol. Wydz. Wet. WSR, Lublin - ANN. UNIV. M. CURIE-SKŁODOWSKA 1958, 11/1956 no., Sect. DD (337-352)

The histiocytic reaction in horses immunized by the micro-organisms of swine erysipelas appears in the spleen, liver, and kidneys. The liver showed the most marked reaction. The author found no changes in the lymph nodes. In contrast to specific reactions such as in tuberculosis, rhinoscleroma etc., this is a non-specific histiocytic reaction.

Horst - Poznań

ZADURA, Jan

Paramphistomum cervi (Schrank, 1790) as the cause of a serious  
disease in stags (Cervus elaphus L). Acta parasit Pol 8 no.21/32:  
345-350 '60.

1. Veterinary Institute, Pulawy.

ZADURA, J.; NIEC, L.

"Mass Poisoning of Horses with Phosphorus Compounds Containing Zinc", p. 550,  
(MEDYCyna WETERYNARSKA, vol. 9, No. 12, Dec. 1953, Warszawa, Poland).

SO: Monthly List of East European Accessions, (EEAL), LC, Vol. 4, No. 5,  
May 1955, Uncl.

ZADURA, Jan (Pulawy)

Anatomic and histopathologic studies on the nature of lesions in  
hog cholera. Rocznauk roln wet 70 no.1/4:270-272 '60.  
(EEAI 10:9)

(Hog cholera)

ZADURA, J.; NIEC, L.(Pulawy)

Anatomic and histopathologic studies on lesions in the preputial diverticulum of swine with particular reference to the presence of bacterial flora. Rocznauk roln wet 70 no.1/4:296-297 '60.  
(EEAI 10:9)

(Swine) (Bacteria)

Country : POLAND  
Category: Virology. Viruses of Man and Animals.  
Rickettsias.

E

Abs Jour: Ref Zhur-Biol., № 23, 1958, № 103558

Author : Lutynski, R.; Nowicki, J.; Starzecka, B.; Zadura, St.;  
Zienichod, T.

Title : "Q" Fever in Krakow

Orig Pub: Przegl. lekar, 1957, № 2, 33-38

Abstract: Cases were observed for the first time in 1956 among persons who had been in contact with sheep wool imported from Rumania shortly before the outbreak. The presence of "Q" fever was confirmed by the complement-fixation reaction with rickettsial antigens.

Card : 1/1

64

Country : BULGARIA

E

Category: Virology. Viruses of Man and Animals.  
Rickettsias.

Abs Jour: Ref Zhur-Diol., No 23, 1958, No 103595

Author : Angelov, St.; Kuyundzhiev, Il.; G'l'bov, S.; Nikolov, P.,  
Daldchiev Yevg.

Inst : Microbiological Institute of Bulgarian Academy of Sciences  
Title : Study of a "Q"-Fever Outbreak in Bulgarian Slaughter-  
House Workers

Orig Pub: Izv. Mikrobiol. in-t D'lg. AN, 1957, 8, 29-34

Abstract: No abstract.

Card : 1/1

**POLAND**

ZADURA, Stanislaw, Clinic of Infectious Diseases (Klinika Chorob Zakaznych), AM [Akademia Medyczna, Medical Academy] in Krakow (Director: Prof. Dr. med. W. FEJKIEL)

"Pancreatic Function in Infectious Hepatitis."

Warsaw-Krakow, Przeglad Lekarski, Vol 19, Ser II, No 4, 63, pp 216-217.

Abstract: [Author's Russian summary modified] Authors reports details of an investigation which lead him to the conclusion that epidemic infectious hepatitis does not affect the pancreas. He believes that the specific tropism of the hepatitis virus affects liver, but not pancreas cells, and that there is not sufficient time for disorders of the stomach, intestine, or bile ducts -- which do affect the pancreas -- to develop. Confirmation of the latter was found in the as yet unpublished study of a colleague at the clinic. The nine (9) references comprise six (6) in Polish and three (3) in Western sources.

1/1

POLAND

ZADURA, Stanislaw, Clinic of Infectious Diseases (Klinika Chorob Zakaznych), AM [Akademia Medyczna, Medical Academy] in Krakow (Director: Prof. Dr. med. Wladyslaw FEJKIEL) and the Municipal Hospital (Szpital Miejski) in Skarzysko-Kamienna (Director: Dr. med. Wladzimierz BORAWSKI)

"Typhoid Fever in Patients from a Focus of Infection in the Powiat of Szydlowiec."

Warsaw-Krakow, Przeglad Lekarski, Vol 19, Ser II, No 4, 63, pp 225-227.

Abstract: Author relates some details of treatment of victims of an outbreak of typhoid fever and notes that despite modern method this is still a grave illness with considerable rate of mortality. Malnutrition, rickets, and other complications cause the course to be severe and fatalities high. Corticoids are not as effective as described in the literature and fail absolutely in cases where diseases of circulation are involved. Local control in Poland would improve with speedier and better health station services, control of carriers, and better training of personnel. The [seven references include 5 Polish and 2 French.

1/1

MACH, Bronislaw; KOWARZ-SOKOLOWSKA, Helena; ZADURA, Stanislaw

Case of acute infectious disease with symmetric cutaneous changes.  
Polski tygod. lek. 12 no.35:1361-1364 26 Aug 57.

1. Z Kliniki Chorob Zakaznych A. M. w Krakowie; kierownik: prof. Jarek Kostrzewski iz z Kliniki Dermatologicznej A. M. w Krakowie; kierownik: prof. Kazimierz Lejman.

(SKIN DISEASES, case reports,  
symmetric lesions in acute infect. (Pol))

ZADURA, Stanislaw

A case of typhus abdominalis in a carrier of typhoid bacilli.  
Przegl. epidem. 15 no.3:289-290 '61.

L. Z Kliniki Chorob Zakaznych AM w Krakowie Kierownik: doc. dr. med.  
Wladyslaw Fejkiel.  
(TYPHOID case reports)

FILIPESCU, M.; MANISCH, E.; CODARCEA, M.; AURELIAN, M.; ZADURIAN, AL.;  
VINCENTZ, I.

Methods and apparatus for extraction and microdetermination of  
hydrocarbons from soil and rocks in the geochemical prospecting  
of hydrocarbon accumulations. Petrol si gaze 14 no.4:169-174 '63.

*1970-1980*  
CYBULSKI, Lech.; HEDNARZOWA, Hanna.; ZADUROWICZ, Krystyna.

Disorders of fat metabolism in burn disease. Polski tygod. lek. 12  
no.27:1026-1028 1 July 57.

1. Z III Chirurgicznej, A.M. w Krakowie; kierownik: prof. dr. med.  
Jerzy Jasieniak. Adres. Krakow Al. Slowackiego 58/3.

(LIPIDS, in blood,

in burns (Pol))

(BURNS, blood in,

lipids, (Pol))

KROTOVSKIY, S.S., kand. tekhn. nauk; KHAR'KIN, A.M., inzh.; ZADVIN, M.V., inzh.;  
KOROTKOV, P.A., inzh.

Making prestressed reinforced concrete construction elements for  
bunker trestles of blast furnaces. Bet. 1 zhel-bet.no.1:11-15 Ja  
'59. (MIRA 12:1)  
(Trestles) (Precast concrete construction)

SOV/97-59-1-3/18

AUTHORS: Krotovskiy, S.S., Candidate of Technical Sciences;  
Khar'kin, A.M., Engineer; Zadvin, M.V. Engineer and  
Korotkov, P.A., Engineer.

TITLE: Construction of Pre-stressed Reinforced Concrete Elements  
of a Ramp Serving a Blast Furnace (Opyt izgotovleniya  
predvaritel'no napryazhennykh zhelezobetonnykh elementov  
bunkeroy estakady domennoy pechi).

PERIODICAL: Beton i Zhelezobeton, 1959, Nr.1, pp.11-15 (USSR)

ABSTRACT: Various basic constructional elements of pre-tensioned  
reinforced concrete ramps serving blast furnaces (i.e. beams,  
frames carrying ore bunkers, railtrucks, and slabs) are  
described. The authors of this project are engineers  
Yu.I. Ukhina and A.Ya. Fridkin. Fig.1 shows cross section  
of the ramp supported at 4570 mm centres. The main  
frame is of 10.38 m span carrying ore bunkers and two  
railway trucks with a total loading of 500 t (see Fig.2).  
The cross-section of the frame is 440 x 2,300 mm, made  
from concrete mark 400 reinforced with 26 batches of high

Card 1/3

SOV/97-59-1-3/18  
Construction of Pre-stressed Reinforced Concrete Elements of a Ramp  
Serving a Blast Furnace.

tensile reinforcement each containing 18 5 mm wires resisting temporary stresses up to 17,000 kg/cm<sup>2</sup>. Six batches of reinforcement are placed in the top zone and 20 batches in the bottom zone of the beam. Fig.3 illustrates beams carrying railway trucks. Technical advice during the erection of the above construction was given by the ASIA SSSR and Lenpromstroyprojekt. The concreting was carried out on open yards using two tower cranes of 3 t capacity and a bridge crane of 30 t capacity. Curved channels for batch reinforcement were formed by means of rubber tubes of 51 mm diameter. The straight channels were formed by means of steel tubes which during concreting were rotated round their axes every 20 minutes and were pulled out after 2 hours. Fig.4 illustrates the formwork and the reinforcement of the frame. In 1 m<sup>3</sup> of concrete the following ingredients were used: 570 kg of cement mark 500; 640 kg of sand; 1,220 kg of coarse aggregate up to 25 mm in size, and 200 l. of water. The water/cement ratio was 0.35. The concrete was delivered in tipping bunkers and consolidated

Card 2/3

SOV/97-59-1-3/18

'Construction of Pre-stressed Reinforced Concrete Elements of a Ramp Serving a Blast Furnace.

by vibrators I-21, I-50 and I-80. The curing lasted 36 hours at a temperature of 80°C. After that the strength of the concrete was great enough to tension the reinforcement, i.e. 360 kg/cm<sup>2</sup>. Fig.5 illustrates the testing of anchoring by jack. A detailed description of tensioning and anchoring problems is given. The cement grout for filling the channels consisted of 2.5 parts of cement mark 500 and 1 part water. The injecting of the grout was carried out by means of a hand-operated suction pump, and when the channel was completely filled a pressure of 2-3 atm was applied. During production of these precast pre-tensioned units various improvements and modifications were found to be necessary. There are 7 figures.

Card 3/3

USSR/Miscellaneous-Production

ZADVORNAYA, P. M.

Card 1/1

Authors : Reshetov, A. V.; Zadvornaya, P. M.; and Petrova, K. I., Engineers

Title : Siberian lumberjacks' experiences with electric power saws

Periodical : Mekh. Trud. Rab., 2, 15 - 17., March 1954

Abstract : Report describes the experience of some Siberian lumberjacks who use electrical power saws for the felling of trees. One particular worker using a power saw TsNIIIME-K5 attained a daily output of 250 m<sup>3</sup> of logs (200% above the government standard). Other workers attained an efficiency of from 160 - 200 m<sup>3</sup> per day as compared with the required norm of 116 m<sup>3</sup>. In addition to the increased output achieved by the use of power saws much fewer accidents have occurred since timber cutting was mechanized. Photo of electrical cutting operation is included.

Institution : ....

Submitted : ....

ACC NR: AP6035752

SOURCE CODE: UR/0413/66/000/019/0124/0124

INVENTOR: Kovalevskiy, B. Ye.; Lotsmanov, S. N.; Zadvornov, M. G.; Khryukina, N. V.;  
Kurbala, Ye. I.; Makarkin, A. Ya.

ORG: none

TITLE: Brazing alloy for vacuum-tube instruments. Class 49, No. 186836

SOURCE: Izobreteniya, promyshlennyye obratzsy, tovarnyye znaki, no. 19, 1966, 124

TOPIC TAGS: brazing alloy, vacuum tube instrument, ~~brazing~~ vacuum tube, electronic  
manufacturing machine

ABSTRACT: This Author Certificate introduces a copper-base brazing alloy, containing  
germanium and palladium, for brazing vacuum-tube instruments. To improve the strength  
and ductility of brazed joints and to lower the melting temperature of the alloy,  
its composition is set as follows: 8-12% germanium, 2-12% palladium, 80-90% copper

SUB CODE: 11, 1309/SUBM DATE: 16Nov65/

UDC: 621.791.36:621.385.002.2

Card 1/1

GOLUTVINA, L.F., kand. tekhn. nauk; PAVLOV, S.A., doktor tekhn. nauk;  
IVANOVA, Ya.I., nauchnyy sotrudnik; POPOVA, P.A., nauchnyy  
sotrudnik; ZADVOZHNOV, V.P., nauchnyy sotrudnik

Operational properties of fireproof coated materials. Nauch.-  
issl. trudy VNIPIK no.14:83-92 '63. (MIRA 18:12)

ZADVORNOV, Yu.N.

Characteristics of the cervical section of the spine in  
people of 31-60 years of age and their diagnostic impor-  
tance. Trudy LIETIM no.16:302-313 '64.

(MIRA 19:1)

1. Leningradskiy nauchno-issledovatel'skiy institut ekspertizy  
trudosposobnosti i organizatsii truda 'invalidov.'

KOSINSKAYA, N.S., prof.; BOGOMAZOVA, V.P., kand.med.nauk; OSTANINA,  
A.M., ekspert-khirurg; ZADVORNOV, Yu.N., mладший научный  
сотрудник

Work capacity in degenerative-dystrophic diseases of the joints  
of the upper extremities. Trudy LIITIN 2:267-286 '59.  
(MIRA 13:7)

(DISABILITY EVALUATION) (EXTREMITIES, UPPER--DISEASES)

ZADVORNOV, Yu.N., mladshiy nauchnyy sotrudnik

Radiographic indexes of the condition of compensation in digestion  
at a late period following resection of the stomach in the light  
of the tasks of disability evaluation. Trudy LIETIN 2:352-360 '59.  
(MIRA 13:7)

(STOMACH--RADIOGRAPHY) (DIGESTION) (DISABILITY EVALUATION)  
(OPERATIONS, SURGICAL)

ZADVORNOV, Yu.N., mladshiy nauchnyy s. trudnik

Error in radiography and expert evaluation in cases of foreign  
bodies. Trudy LIETIN 2:361-368 '59.  
(DISABILITY EVALUATION) (FOREIGN BODIES (SURGERY))  
(MIRA 13:7)

ZADVORNOV, Yu.N.

ZADVORNOV, Yu.N.

X-ray diagnosis of ulcer of the gastric stump [with summary in English]. Vest. rent. i rad. 32 no.4:49-56 J1-4g '57. (MIRA 10:11)

1. Iz rentgenologicheskogo otdeleniya (zav. - prof. N.S.Kosinskaya) Leningradskogo nauchno-issledovatel'skogo instituta ekspertizy trudosposobnosti i trudoustroystva knavlidov (dir. - dotsent A.A. Ivanov)

(PEPTIC ULCER, diag.

x-ray, of gastric stump)

(GASTRECTOMY, compl.

peptic ulcer of stump, x-ray diag.)

VORONOV, A.G.; ZADVORNOVA, L.V.

Effect of the relief on the distribution of subtropical forests  
in Yunnan (the Chinese People's Republic). Biul. MOIP. Otd. biol.  
70 no.2:55-66 Mr-Ap '65. (MIRA 12:5)

ROKHLIN, D.G., ZADVORNOVA, V.P.

Dynamic roentgenologic data on condition of the gastroin-  
testinal system following total gastrectomy in cancer.  
Vest. rentg., Moskva No.2:47-53 Mar-Apr 1953. (OBL 25:5)

1. Professor, Corresponding Member AMS USSR for Rokhlin;  
Candidate Medical Sciences for Zadvornova. 2. Of the Faculty  
Surgical Clinic and the Department of Roentgenology of First  
Leningrad Medical Institute imeni Academician I.P. Pavlov.

ZADVOR NOVA, V.P.  
ROKHIN, D.G.; ZADVORNOVA, V.P.

Prolonged observations of the result of combined treatment for  
patients with cancer of the thyroid gland by the surgical method,  
X-rays and radioactive iodine. Med.rnd. 7 no.6:36-42 Je '62.  
(MIRA 15:8)

(THYROID GLAND - CANCER) (IODINE - ISOTOPES)  
(X RAYS - THERAPEUTIC USE)

ROKHLIN, D.G.; ZADVORNOVA, V.P.

Prolonged observations of the result of combined treatment for patients with cancer of the thyroid gland by the surgical method, X-rays and radioactive iodine. Med. rad. 7 no. 6:3 "42 Je '62.

(MIRA 15:8)

(THYROID GLAND--CANCER) (IODINE--ISOTOPES)  
(X-RAYS--THERAPEUTIC USE)

ROKHLIN, D.G., prof.; DRACHINSKAYA, Ye.S., prof.; ZADYORNOVA, V.P., dots.

Two-year follow-up on the treatment of thyroid cancer with surgery,  
x-rays and radioactive iodine [with summary in English]. Vest.  
rent. i rad. 32 no.6:3-7 N-D '57. (MIRA 11:3)

1. Iz 1 Leningradskogo mediteinskogo instituta imeni akad.  
I.P.Pavlova. 2. Chlen-korrespondent AMN SSSR (for Rokhlin).  
(THYROID GLAND, neoplasms  
surg., radiother. & radioiodine, 2-year follow-up (Rus)

GONCHARENKO, V.V., doktor geol. min. nauk (deceased); MIRZEEV, A.P., Inzh.;  
ZABYKHOVA, Ye.G., Inzh.; SULTAN, A.R., Inzh.

Heat conductivity of commercial refractories. Trudy Inst. spets. no. 35:26-44 '63.  
(MIRA 17:12)

BLUVSHTEYN, M.N.; BORICHEVA, V.N.; Prinimali uchastiye: ALEKSEYEVA, A.N.;  
GREGORNIKOVA, Z.Ye.; PETROVA, Ye.V.; ZADVORNOVA, Ye.G.; AYZENBERG, A.S.;  
YAKOVLEVA, V.S.

Zonal changes in the properties of magnesite bricks after service  
in the crown of open hearth furnaces. Ogneupory 28 no.9:413-418  
'63. (MIRA 16:10)

1. Vsesoyuznyy institut ogneuporov.

ZADVORNYAK, P.V.

Study of specific therapy of colienteritis on an experimental  
model. Zdrav.Tadzh. 9 no.3:16-18 My-Je '62. (MIRA 15:8)

1. Iz Dushanbinskogo instituta epidemiologii i gigiyeny.  
(INTESTINES--DISEASES) (SERUM THERAPY)

VAYSBURD, I.A.; ZADVORNIK, P.V.

Clinical and electrocardiographic observations during the 1957  
influenza outbreak in Stalinabad. Zdrav. Tadzh. 6 no.6:19-22  
'59. (MIRA 13:4)

1. Iz kafedry infektsionnykh bolezney (zav. - dotsent D.N. Khashimov)  
Stalinabadskogo medinstituta im. Abuali ibni Sino.  
(STALINABAD--INFLUENZA) (ELECTROCARDIOGRAPHY)

ZADVORNYAK, P.V.

Dynamics of the incidence of acute contagious conjunctivitis in the  
city of Kanibadam. Trudy AH Tadzh. SSR 40:137-139 '55. (KIRA 9:10)  
1. Iz kanibadamskogo trakhomatoznogo dispensera (glavvrach - V.K. Sha-  
ripov) (KANIBADAM--CONJUNCTIVITIS)

ZADVORNYAK, P.V.

Protective properties of immune colisera. Zdrav. Tedzh. 8 no.5:  
17-20 S-0 '61. (MIA 15:1)

1. Iz Stalinabadskogo instituta epidemiologii i gigiyeny.  
(SERUM) (INTESTINES-DISEASES)

ZATSEPIN, N.I.; ZADVORNYAK, P.V.

Experimental studies of the immunology of colienteritis. Zhur. mikrobiol., epid. immun. 32 no.9:112-116 S '61. (MIRA 15:2)

1. Iz Stalinabadskogo instituta epidemiologii i gigiyeny.  
(*ESCHERICHIA COLI*) (IMMUNITY)

ZADVORNY, G.M., inzh.

Experimental investigation of hydraulic fill above water.  
Izv. VNIIG 58:145-161 '58. (MIRA 13:7)  
(Hydraulic engineering)

GORYUNOV, S.I., inzh.; ZADVORNY, G.M., inzh.; YAGLI, Ye.Z., inzh.

Design of slag and ash conduits. Energetik 7 no.4:26-29 Ap. '59.  
(MIRA 12:5)

(Electric power plants)

ZADVOROCHIEV, S.P.; SORVACHEV, K.P.

Electrophoretic study of serum protein fraction in immunized breeder carps and their progeny. Biokhimiia 24 no.5:811-816 S-O '59.  
(MIRA 13:2)

1. Laboratoriya ikhtiopatologii Vserossiyskogo nauchno-issledovatel'skogo Instituta prudovogo rybnogo khozyaystva i Kafedra biokhimii zhivotnykh Gosudarstvennogo universiteta im. M.V. Lomonosova, Moskva.

(RUBELLA immunol.)

(VACCINATION)

(BLOOD PROTEINS)

(FISH dis.)

ZADVORNYY, G.M., kand.tekhn.nauk; NAGLI, Ye.Z., inzh.

Method for calculating hydraulic pressure conveying of ashes and  
slag. Elek.sta. 32 no.8:20-25 Ag '61. (MFA 14:10)  
(Hydraulic conveying)

ZADVORNYI, G. M., Candidate Tech Sci (diss) -- "Investigation of alluvium of sandy soil above the water level". Leningrad, 1959. 15 pp (Min Construction of Electric Power Plants USSR, All-Union Sci Res Inst of Hydraulic Engineering im B. Ye. Vedeneyev), 200 copies (KL, No 24, 1959, 136)

SOV/91-59-4-19/28

8 (6)

AUTHORS: Goryunov, S. I., Zadvornyy, G. M., Nagli, Ye. S., Engineers

TITLE: The Calculation of Ash and Slag Pipelines  
(O raschëte zoloshlakoprovodov)

PERIODICAL: Energetik, 1959, Nr 4, pp 26 - 29 (USSR)

ABSTRACT: In the power plants of the USSR, ash and slag are transported to the ash dumps by hydraulic devices and pipelines, for example with the Moskal'kov hydraulic apparatus or by dredger pumps. In 1956, VNIIG began an investigation of existing hydraulic ash removal systems on an experimental installation for obtaining the theoretical grounds for calculating pressure lines for ash and slag removal. For this purpose, the hydraulic ash and slag removal systems of the Chelyabinsk and Voronezh power plants were investigated. Dredger pump systems were tested at the Shterov GES. The data of these investigations were used for building an experimental installation using the Moskal'kov hydraulic equipment reduced to one third its actual size. The experimental data were compared with the data obtained from full-scale ash removal

Card 1/2

SOV/91-59-4-19/28

The Calculation of Ash and Slag Pipelines

installations. Figure 1 shows a graphic representation of this comparison. The authors present formulas for calculating ash and slag pipelines and recommend speeds at which ash and/or slag should be transported. Slag alone may be transported at speeds of 1.8 - 2.2 m/sec, slag and ash 1.6-1.9 m/sec and ash alone 1.2-1.4 m/sec. There are 2 graphs and 2 tables.

Card 2/2

RUSINOV, I.Ya., kandidat tekhnicheskikh nauk; ZADVORNYI, G.M., inzhener.

Radiometric methods of investigating the effect of the consistency  
and specific rate of flow of pulp on the density of washed soils.  
Gidr.stroi. 25 no.2:29-33 '56. (MLRA 9:8)  
(Soil mechanics)

ZADVORNY, G.M.

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